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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,219	06/19/2001	Kars-Michiel Hubert Lenssen	NL 000361	3007

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PHILIPS ELECTRONICS NORTH AMERICAN CORP
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EXAMINER

STRECKER, GERARD R

ART UNIT	PAPER NUMBER
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2862

DATE MAILED: 05/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/884,219

Applicant(s)
Lenssen et al

Examiner
Gerard Strecker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Apr 17, 2003
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-11 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

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Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. At line 2, it is not clear what "the substrate" refers to.

Claim 6 is objected to in that the recitation "within the odd number of non-adjacent ferromagnetic layers form a stack of layers" is awkward.

Claims 1 and 3-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill (6,275,363) in view of Olivas et al (6,507,187, newly cited) or Sano et al (6,430,012, newly cited), or, as being unpatentable over Gill (6,219,209) in view of Olivas et al or Sano et al, and further in view of Gill (6,275,363).

Gill (6,275,363) discloses (Figs. 11, 12) a magneto-resistive device comprising a free (212) and a pinned (206) ferromagnetic layer separated by a non-magnetic copper spacer layer 304 (Fig. 12) therebetween. The pinned layer comprises a layer system having three (230, 232, 236) non-adjacent ferromagnetic layers in the form of a stack. The layers may all be Co or CoFe, or apparently any permutation thereof. An exchange biasing layer 244 is adjacent the layer system and magnetically influences the layer system. Each of the intermediate layers (228, 234) is a Ru layer. Gill (6,275,363) does not disclose that the copper spacer layer is contiguous on both sides with a Co or CoFe layer, as recited in claim 1.

Gill (6,219,209) discloses (Fig. 7) a magneto-resistive device comprising: a substrate (725) which carries a free (718) and a pinned (720) ferromagnetic layer, said pinned layer comprising a layer system (720) including a stack of three (750, 854, 758) ferromagnetic layers

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and two (752, 756) intermediate non-magnetic layers. The layer 750 is formed of Co, and layers 754 and 758 may be formed of CoFe (column 7, lines 19-33). The free and pinned layers are separated by a copper (Cu) spacer layer 722 (column 7, lines 34-36). The intermediate layers 752 and 756 are formed of Ru (column 7, lines 21-25) as called for in claim 4. An exchange biasing layer (AFM layer 724) is arranged adjacent the layer system 720 between the substrate 725 and the layer system, and magnetically influences the system. Since the thickness of the ferromagnetic layers may be within a range (column 7, lines 19-33), selection of different thickness for the individual-layers (claims 7 and 8) would be implicit. Magnetoresistive devices of the type disclosed by Gill are conventionally manufactured for use in data storage systems (claim 9) and as magnetic memories (claim 10). Gill (6,219,209), also, does not disclose the copper layer being contiguous on both sides with a Co or CoFe layer, although Co layer 750 is contiguous on one side of the copper layer 722.

Olivas et al (Fig. 2) discloses a multi-layer magneto-resistive device in which a copper layer 150 is deposited between a Permalloy layer 130 and an iron manganese layer 170. The copper layer is contiguous on both sides with cobalt layers 140 and 160. The cobalt layers are deposited to separate the mixing of Permalloy and copper and the mixing of iron manganese and copper (col. 7, lines 29, 30), and to prevent diffusion of the Permalloy and copper and boost GMR ratio (col. 5, lines 10-12).

Sano et al discloses (Fig. 1) a multi-layer magneto-resistance device composing a metal layer 30, which may be copper (col. 10, lines 13-16), adjacent a free magnetic layer 20, which

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may be formed of FeNi (col. 9, lines 43-45). The layer 20 is formed with a Co layer contiguous to the metal layer to prevent diffusion (of Ni) from the layer 20 toward the metal layer (col. 9, lines 49-65) and improve MR ratio.

It would have been obvious to one skilled in the art to provide the magnetoresistive devices of Gill (6,275,363) and Gill (6,219,209) with Co layers contiguous with the copper layer, as taught by Olivas et al and Sano et al. Provision of such layers would be motivated by the elimination of diffusion into the copper layer and the enhancement of the MR ratio achieved by such provision. In addition, it would have been obvious to one skilled in the art to make all three of the ferromagnetic layers of Gill (6,219,209) CoFe layers (claim 4), as merely the implementation of a recognized manufacturing option, as taught by Gill (6,275,363), and to make the ferromagnetic layers of Gill (6,275,363) outside the stack thinner or thicker than the center layer (claim 8) as merely a routine design expedient in consideration of optimum size desirabilities and magnetic coupling requirements for the device.

Applicant's arguments with respect to claims 1 and 2-11 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**


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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication should be directed to G. R. Strecker at telephone number (703) 305-4937.

G R STRECKER/pj

05/08/03


GERARD R. STRECKER
PRIMARY EXAMINER